FCC REPORT

Applicant:	Shenzhen Arashi Vision Company Limited
Address of Applicant:	6/F, Building A, Logan Century Center Haixiu Road, Bao an District, Shenzhen, Guangdong 518000, China
Manufacturer/Factory:	Shenzhen Arashi Vision Company Limited
Address of Manufacturer/Factory:	6/F, Building A, Logan Century Center Haixiu Road, Bao an District, Shenzhen, Guangdong 518000, China

Equipment Under Test (EUT)

Product Name:	Insta360 Titan
Model No.:	TINTITA/A, TINTITA
Trade Mark:	Insta360
FCC ID:	2AFSH-TINTITA-A
Applicable standards:	FCC CFR Title 47 Part 15 Subpart E Section 15.407
Date of sample receipt:	April 10, 2019
Date of Test:	April 11-24, 2019
Date of report issue:	April 25, 2019
Test Result :	PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Robinson Lo
Laboratory Manager

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

2 Version

Version No.	Date	Description
00	*April 25, 2019*	*Original*

Prepared By: Bill. Yuan ***Date:*** *April 25, 2019*

Project Engineer

Check By: ***Date:*** *April 25, 2019*

Reviewer

3 Contents

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	PASS
AC Power Line Conducted Emission	15.207	PASS
Peak Transmit Power	15.407(a)(1)	PASS
Power Spectral Density	15.407(a)(1)	PASS
Undesirable Emission	15.407(b)(6), 15.205/15.209	PASS
Radiated Emission	15.205/15.209	PASS
Band Edge	15.407(b)(1)	PASS
Frequency Stability	15.407(g)	PASS

Remark:

Pass: The EUT complies with the essential requirements in the standard.

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz ~ 30MHz	± 4.54dB	(1)
Radiated Emission	30MHz ~ 1000MHz	± 5.34dB	(1)
Radiated Emission	1GHz ~ 40GHz	± 5.34dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	± 3.44dB	(1)
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.			
Remark: Test according to ANSI C63.10:2013 and ANSI C63.4:2014			

5 General Information

5.1 General Description of EUT

Product Name:	Insta360 Titan
Model No.:	TINTITA/A, TINTITA
Test Model No:	TINTITA/A
Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. *The only difference is model name for commercial purpose.*	
Serial No.:	ITGWWYYNXXXXXX
Hardware Version:	Titan_MB_V0.7
Software Version:	V: X.X.X
Test Sample(s) ID:	GTS201904000074-1
Sample(s) Status:	Engineer sample
Operation Frequency:	802.11a/802.11n(HT20)/802.11ac(HT20): 5180MHz ~ 5240MHz 802.11n(HT40)/ 802.11ac(HT40): 5190MHz ~ 5230MHz 802.11ac(HT80): 5210MHz
Channel Numbers:	802.11a/802.11n(HT20)/802.11ac(HT20): 4 802.11n(HT40)/ 802.11ac(HT40): 2 802.11ac(HT80): 1
Channel Separation:	802.11a/802.11n(HT20)/802.11ac(HT20): 20MHz 802.11n(HT40)/ 802.11ac(HT40): 40MHz 802.11ac(HT80): 80MHz
Modulation Technology:	OFDM
Antenna Type:	External Antenna
Antenna Gain:	2.00dBi(declare by applicant)
Power Supply:	Adapter Model: HKA18019095-7A Input: AC 100-240V, 50/60Hz, 3A Max Output: DC 19V, 9.47A Or Battery: DC 14.4V

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180MHz	40	5200MHz	44	5220MHz	48	5240MHz
38	5190MHz	42	5210MHz	46	5230MHz		

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Test channel	Frequency (MHz)		
	802.11 a/n/ac(HT20)	802.11 n/ac(HT40)	802.11ac(HT80)
Lowest channel	5180MHz	5190MHz	
Middle channel	5200MHz		5210MHz
Highest channel	5240MHz	5230MHz	

5.2 Test mode

Transmitting mode	Keep the EUT in transmitting with modulation. EUT was test with 99% duty cycle at its maximum power control level.
Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.	

5.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

● **FCC —Registration No.: 381383**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 381383.

● **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2.

● **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

● **CNAS (No. CNAS L5775)**

CNAS has accredited Global United Technology Services Co., Ltd., to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

5.4 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, sBaoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480

Fax: 0755-27798960

5.5 Description of Support Units

None.

5.6 Deviation from Standards

None.

6 Test Instruments list

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 03 2015	July. 02 2020
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 27 2018	June. 26 2019
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 27 2018	June. 26 2019
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 27 2018	June. 26 2019
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 27 2018	June. 26 2019
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 27 2018	June. 26 2019
9	Coaxial Cable	GTS	N/A	GTS211	June. 27 2018	June. 26 2019
10	Coaxial cable	GTS	N/A	GTS210	June. 27 2018	June. 26 2019
11	Coaxial Cable	GTS	N/A	GTS212	June. 27 2018	June. 26 2019
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 27 2018	June. 26 2019
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 27 2018	June. 26 2019
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 27 2018	June. 26 2019
15	Band filter	Amindeon	82346	GTS219	June. 27 2018	June. 26 2019
16	Power Meter	Anritsu	ML2495A	GTS540	June. 27 2018	June. 26 2019
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 27 2018	June. 26 2019
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 27 2018	June. 26 2019
19	Splitter	Agilent	11636B	GTS237	June. 27 2018	June. 26 2019
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 27 2018	June. 26 2019
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 20 2018	Oct. 19 2019
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 20 2018	Oct. 19 2019
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 20 2018	Oct. 19 2019
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 27 2018	June. 26 2019

Conducted Emission						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.16 2014	May.15 2019
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 27 2018	June. 26 2019
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 27 2018	June. 26 2019
4	Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	GTS226	June. 27 2018	June. 26 2019
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	June. 27 2018	June. 26 2019
8	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	June. 27 2018	June. 26 2019

Conducted:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	June. 27 2018	June. 26 2019
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 27 2018	June. 26 2019
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 27 2018	June. 26 2019
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 27 2018	June. 26 2019
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 27 2018	June. 26 2019
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 27 2018	June. 26 2019
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 27 2018	June. 26 2019
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 27 2018	June. 26 2019

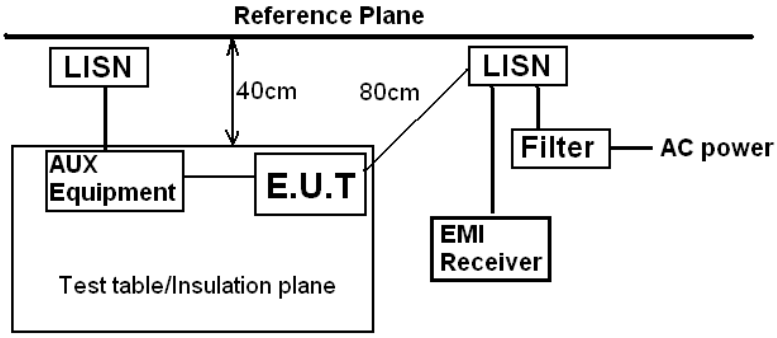
General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 27 2018	June. 26 2019
2	Barometer	ChangChun	DYM3	GTS255	June. 27 2018	June. 26 2019

7 Test results and Measurement Data

7.1 Antenna requirement:

Standard requirement:	FCC Part15 C Section 15.203
15.203 requirement: *An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.*	
E.U.T Antenna:	
The antenna is external antenna, the best case gain of the antenna is 2.0dBi, reference to the appendix I for details.	

7.2 Conducted Emissions

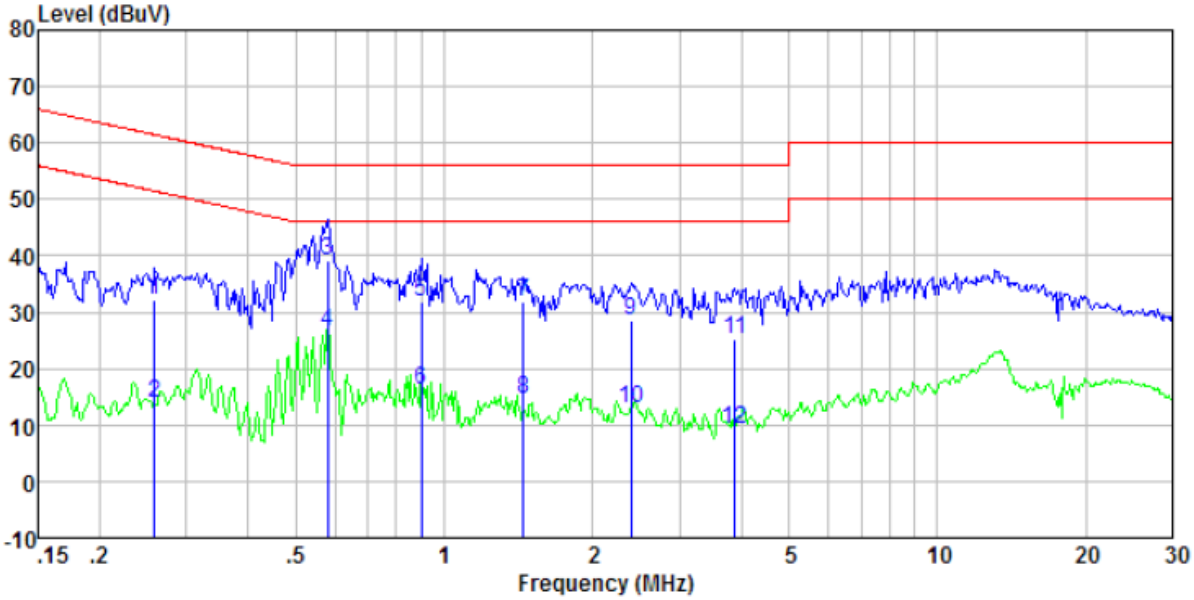
<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.207</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013</td></tr>
<tr><td>Test Frequency Range:</td><td>150KHz to 30MHz</td></tr>
<tr><td>Class / Severity:</td><td>Class B</td></tr>
<tr><td>Receiver setup:</td><td>RBW=9KHz, VBW=30KHz</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBuV)</td></tr>
<tr><td>Quasi-peak</td><td>Average</td></tr>
<tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr>
<tr><td>0.5-5</td><td>56</td><td>46</td></tr>
<tr><td>5-30</td><td>60</td><td>50</td></tr>
</table>
* Decreases with the logarithm of the frequency.
</td></tr>
<tr><td>Test procedure</td><td>The E.U.T and simulators are connected to the main power through a line impedance stabilization network(L.I.S.N.). The provide a 50ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs). Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.</td></tr>
<tr><td>Test setup:</td><td> 

Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m</td></tr>
<tr><td>Test Instruments:</td><td>Refer to section 5.10 for details</td></tr>
<tr><td>Test mode:</td><td>Refer to section 5.2 for details</td></tr>
<tr><td>Test voltage:</td><td>AC 120V, 60Hz</td></tr>
<tr><td>Test results:</td><td>Pass</td></tr>
</table>

Remark: Both high and low voltages have been tested to show only the worst low voltage test data.

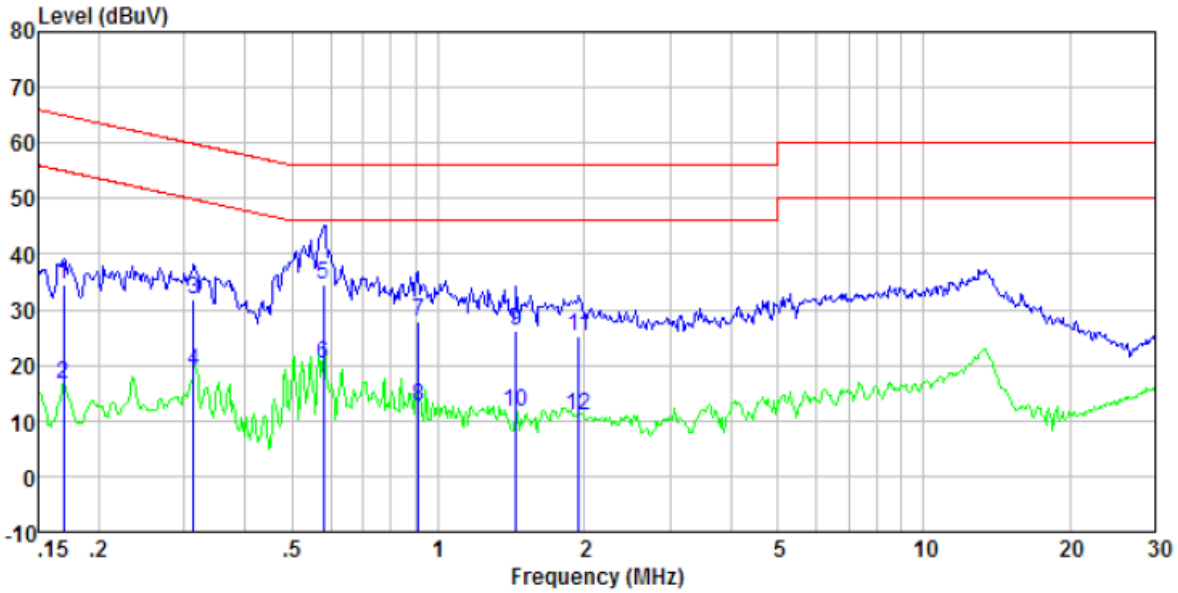
Measurement Data

Mode:	**Transmitting mode**	**Test by:**	**Bill**
Temp./Hum.(%H):	**26℃/56%RH**	**Probe:**	**Line**



Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.26	31.62	0.40	0.10	32.12	61.47	-29.35	QP
0.26	13.26	0.40	0.10	13.76	51.47	-37.71	Average
0.58	38.68	0.29	0.12	39.09	56.00	-16.91	QP
0.58	26.21	0.29	0.12	26.62	46.00	-19.38	Average
0.90	31.36	0.22	0.14	31.72	56.00	-24.28	QP
0.90	15.99	0.22	0.14	16.35	46.00	-29.65	Average
1.45	31.37	0.20	0.16	31.73	56.00	-24.27	QP
1.45	14.12	0.20	0.16	14.48	46.00	-31.52	Average
2.40	28.01	0.20	0.18	28.39	56.00	-27.61	QP
2.40	12.69	0.20	0.18	13.07	46.00	-32.93	Average
3.88	24.71	0.20	0.18	25.09	56.00	-30.91	QP
3.88	8.90	0.20	0.18	9.28	46.00	-36.72	Average

Mode:	**Transmitting mode**	**Test by:**	**Bill**
Temp./Hum.(%H):	**26℃/56%RH**	**Probe:**	**Neutral**

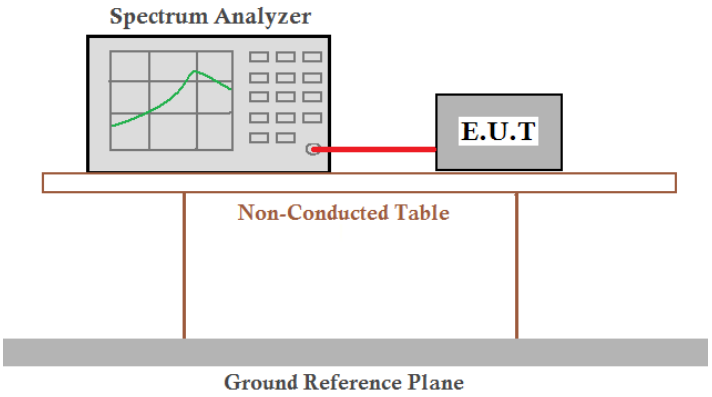


Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.17	33.85	0.40	0.09	34.34	64.99	-30.65	QP
0.17	16.11	0.40	0.09	16.60	54.99	-38.39	Average
0.31	31.36	0.39	0.10	31.85	59.88	-28.03	QP
0.31	18.49	0.39	0.10	18.98	49.88	-30.90	Average
0.58	34.04	0.29	0.12	34.45	56.00	-21.55	QP
0.58	19.89	0.29	0.12	20.30	46.00	-25.70	Average
0.91	27.44	0.22	0.14	27.80	56.00	-28.20	QP
0.91	12.10	0.22	0.14	12.46	46.00	-33.54	Average
1.45	25.71	0.20	0.16	26.07	56.00	-29.93	QP
1.45	11.20	0.20	0.16	11.56	46.00	-34.44	Average
1.95	24.90	0.20	0.17	25.27	56.00	-30.73	QP
1.95	10.71	0.20	0.17	11.08	46.00	-34.92	Average

Notes:

1. *An initial pre-scan was performed on the line and neutral lines with peak detector.*
2. *Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.*
3. *Final Level =Receiver Read level + LISN Factor + Cable Loss*
4. *If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.*

7.3 Emission Bandwidth and 99% Occupied Bandwidth

Test Requirement:	FCC Part15 E Section 15.407
Test Method:	KDB 789033 D02 General U-NII Test Procedures New Rules v02r01
Limit:	N/A
Test setup:	
Test procedure:	According to KDB 789033 D02 General U-NII Test Procedures New Rules v02r01.
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

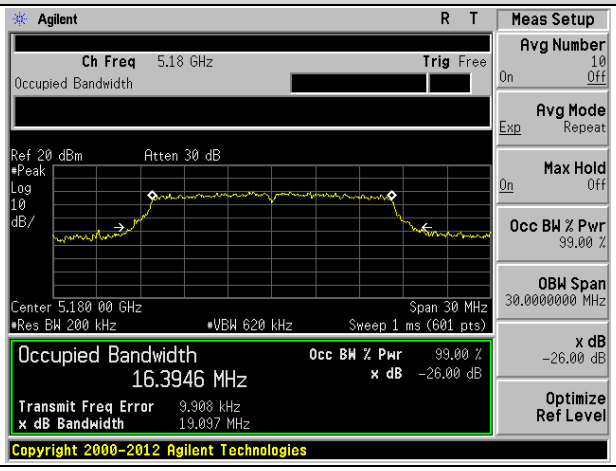
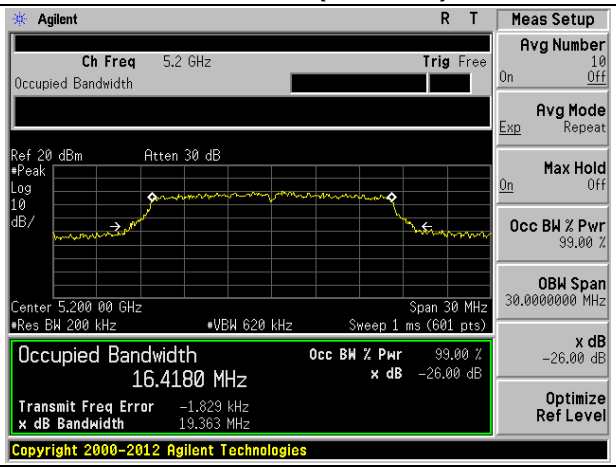
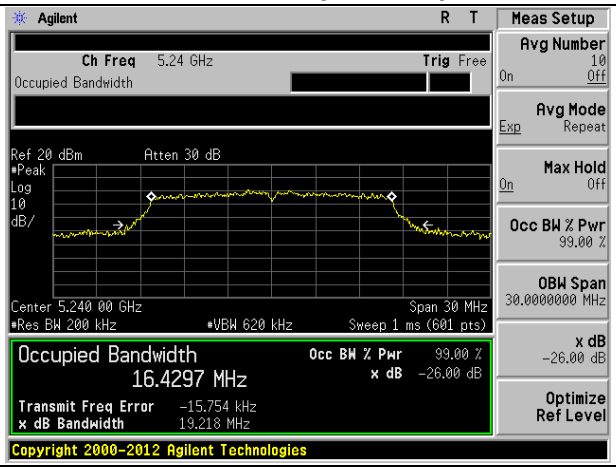
Measurement Data:

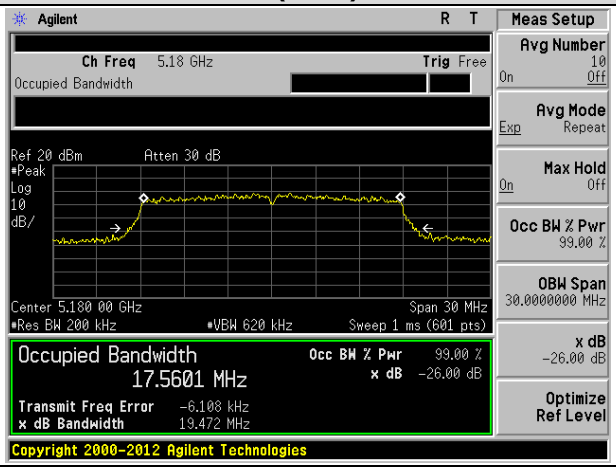
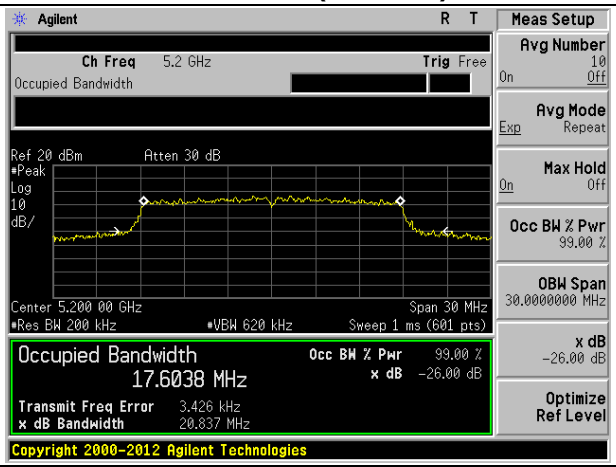
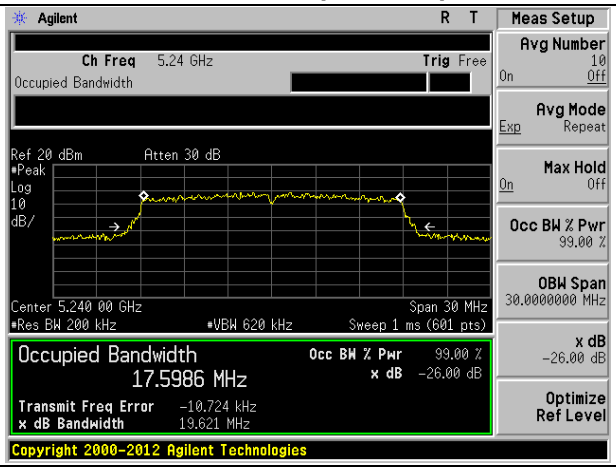
CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)			26dB Occupied Bandwidth (MHz)		
		802.11a	802.11n (HT20)	802.11ac (HT20)	802.11a	802.11n (HT20)	802.11ac (HT20)
36	5180.00	16.3946	17.5601	17.5868	19.097	19.472	19.579
40	5200.00	16.4180	17.6038	17.6245	19.363	20.837	20.082
48	5240.00	16.4297	17.5986	17.5975	19.218	19.621	19.617

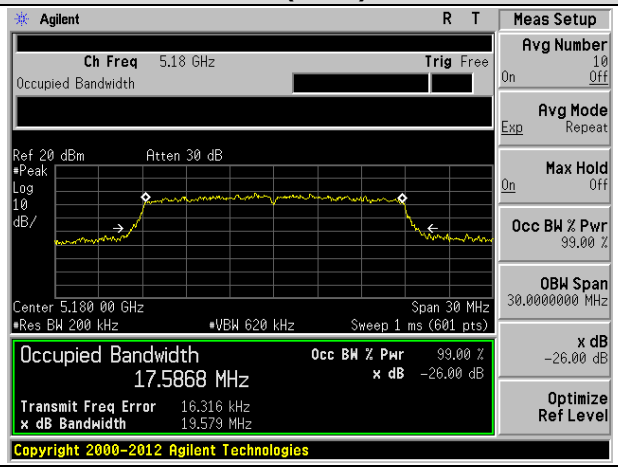
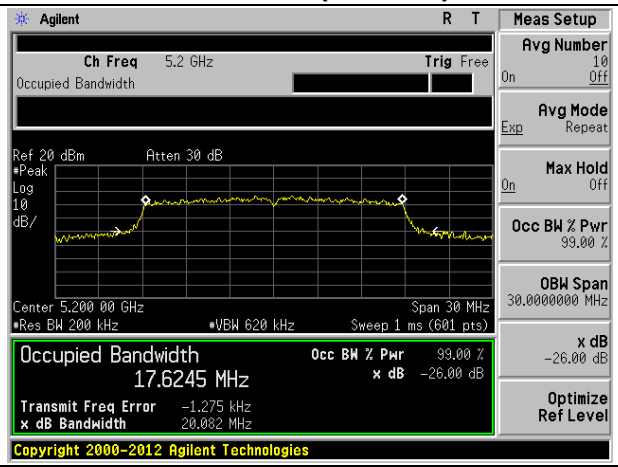
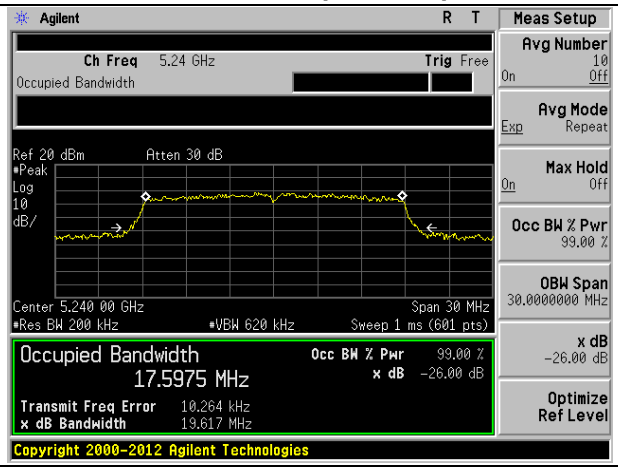
CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)		26dB Occupied Bandwidth (MHz)	
		802.11n(HT40)	802.11ac(HT40)	802.11n(HT40)	802.11ac(HT40)
38	5190.00	35.9320	35.9422	38.883	39.485
46	5230.00	35.9456	35.9921	39.545	39.319

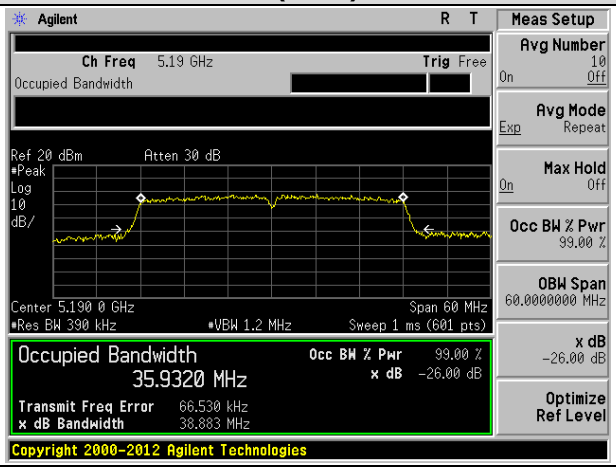
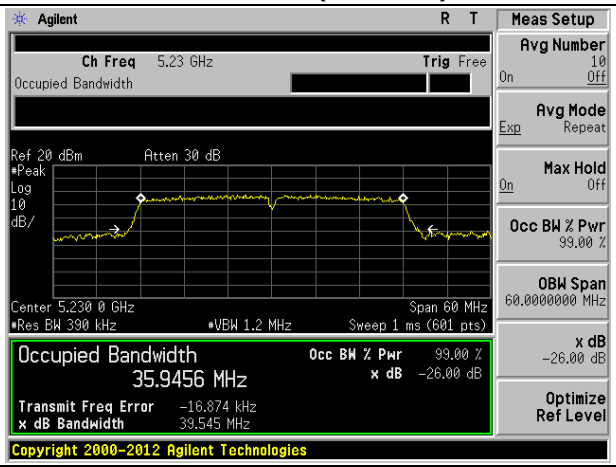
CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26dB Occupied Bandwidth (MHz)
		802.11ac(HT80)	802.11ac(HT80)
42	5210.00	75.1597	77.658

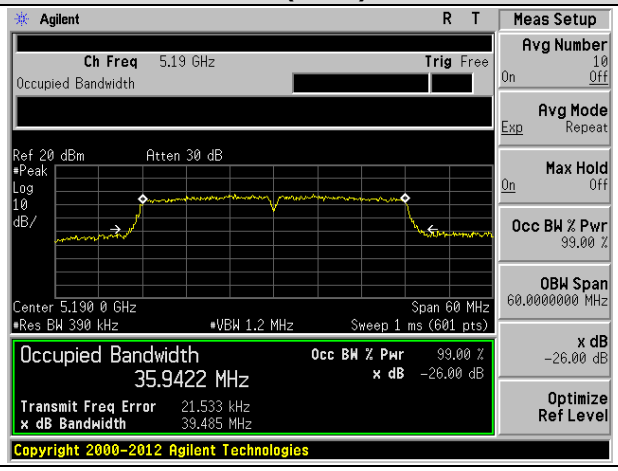
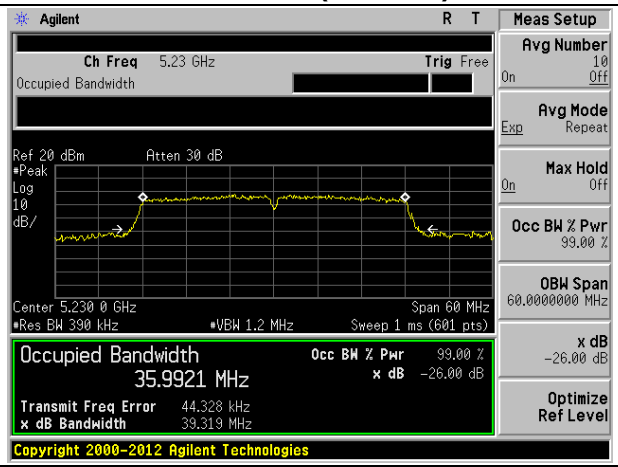
Test plots as followed:

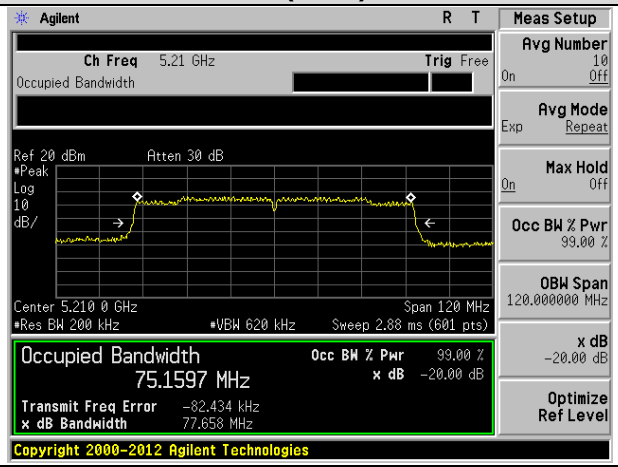
802.11a mode

Channel 36 (5180MHz)

Channel 40 (5200MHz)

Channel 48 (5240MHz)

802.11n(HT20) mode

Channel 36 (5180MHz)

Channel 40 (5200MHz)

Channel 48 (5240MHz)

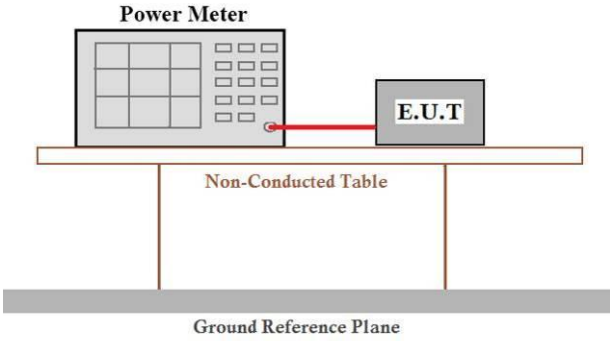
802.11ac(HT20) mode

Channel 36 (5180MHz)

Channel 40 (5200MHz)

Channel 48 (5240MHz)

802.11n(HT40) mode

Channel 38 (5190MHz)

Channel 46 (5230MHz)

802.11ac(HT40) mode

Channel 38 (5190MHz)

Channel 46 (5230MHz)

802.11ac(HT80) mode

Channel 42 (5210MHz)

7.4 Peak Transmit Power

Test Requirement:	FCC Part15 E Section 15.407
Test Method:	KDB 789033 D02 General U-NII Test Procedures New Rules v02r01
Limit:	For the band 5.15-5.25 GHz, the maximum conducted output power over the frequency bands of operation shall not exceed 250mW.
Test setup:	
Test procedure:	**Measurement using an RF average power meter** (i) Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied a) The EUT is configured to transmit continuously or to transmit with a constant duty cycle. b) At all times when the EUT is transmitting, it must be transmitting at its maximum power control level. c) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five. (ii) If the transmitter does not transmit continuously, measure the duty cycle, x, of the transmitter output signal as described in section B). (iii) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter. (iv) Adjust the measurement in dBm by adding 10 log(1/x) where x is the duty cycle (e.g., 10log(1/0.25) if the duty cycle is 25 percent).
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

802.11a mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
36	5180.00	12.17	0.04	12.21	23.98	Pass
40	5200.00	12.12	0.04	12.16	23.98	Pass
48	5240.00	12.48	0.04	12.52	23.98	Pass

802.11n(HT20) mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
36	5180.00	10.77	0.04	10.81	23.98	Pass
40	5200.00	11.39	0.04	11.43	23.98	Pass
48	5240.00	11.53	0.04	11.57	23.98	Pass

802.11ac(HT20) mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
36	5180.00	10.64	0.04	10.68	23.98	Pass
40	5200.00	11.49	0.04	11.53	23.98	Pass
48	5240.00	11.27	0.04	11.31	23.98	Pass

802.11n(HT40) mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
38	5190.00	10.15	0.04	10.19	23.98	Pass
46	5230.00	9.98	0.04	10.02	23.98	Pass

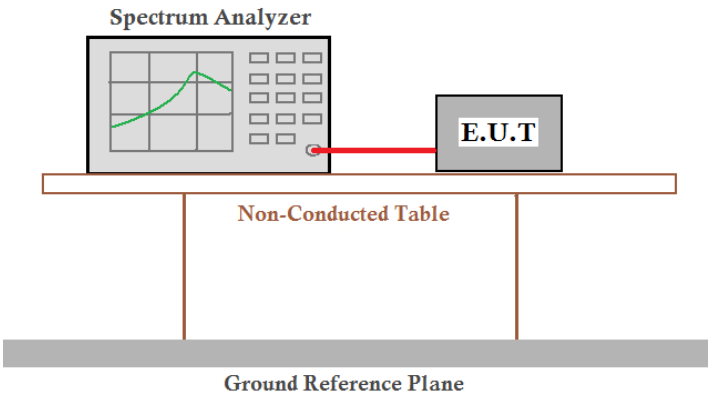
802.11 ac(HT40) mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
38	5190.00	10.24	0.04	10.28	23.98	Pass
46	5230.00	9.94	0.04	9.98	23.98	Pass

802.11 ac(HT80)						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
42	5210.00	9.74	0.04	9.78	23.98	Pass

Note: Output Power = Measured Power + Duty Factor

Duty Factor = 10 log (1/Duty Cycle)

7.5 Power Spectral Density

Test Requirement:	FCC Part15 E Section 15.407
Test Method:	KDB 789033 D02 General U-NII Test Procedures New Rules v02r01
Limit:	11dBm/MHz
Test setup:	
Test procedure:	1) Create an average power spectrum for the EUT operating mode being tested by following the instructions in section E)2) for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, “Compute power…”. 2) Use the peak search function on the instrument to find the peak of the spectrum. 3) Make the following adjustments to the peak value of the spectrum, if applicable: a) If Method SA-2 or SA-2 Alternative was used, add 10 log(1/x), where x is the duty cycle, to the peak of the spectrum. b) If Method SA-3 Alternative was used and the linear mode was used in step E)2)g)(viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging. 4) The result is the PSD.
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

802.11a mode						
Channel No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
36	5180.00	4.06	0.04	4.10	11	Pass
40	5200.00	2.06	0.04	2.10	11	Pass
48	5240.00	4.24	0.04	4.28	11	Pass

802.11n(HT20) mode						
Channel No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
36	5180.00	3.67	0.04	3.71	11	Pass
40	5200.00	1.54	0.04	1.58	11	Pass
48	5240.00	3.08	0.04	3.12	11	Pass

802.11ac(HT20) mode						
Channel No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
36	5180.00	2.71	0.04	2.75	11	Pass
40	5200.00	0.75	0.04	0.79	11	Pass
48	5240.00	4.07	0.04	4.11	11	Pass

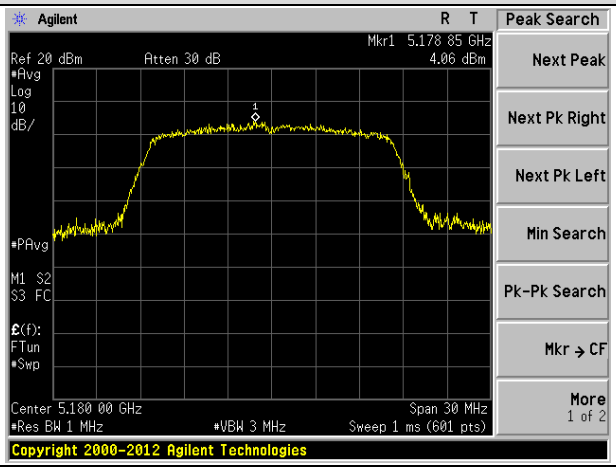
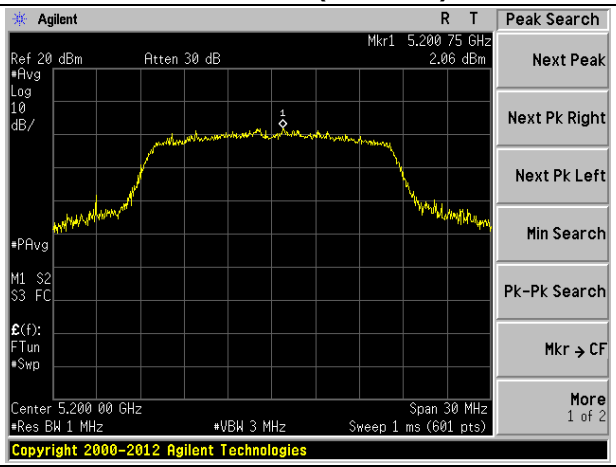
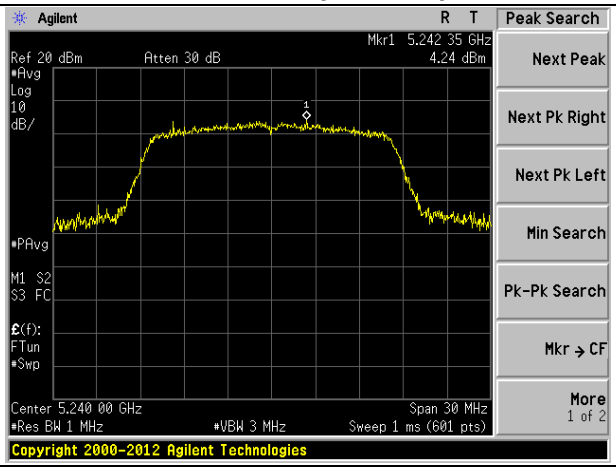
802.11n(HT40) mode						
Channel No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
38	5190.00	-0.56	0.04	-0.52	11	Pass
46	5230.00	0.00	0.04	0.04	11	Pass

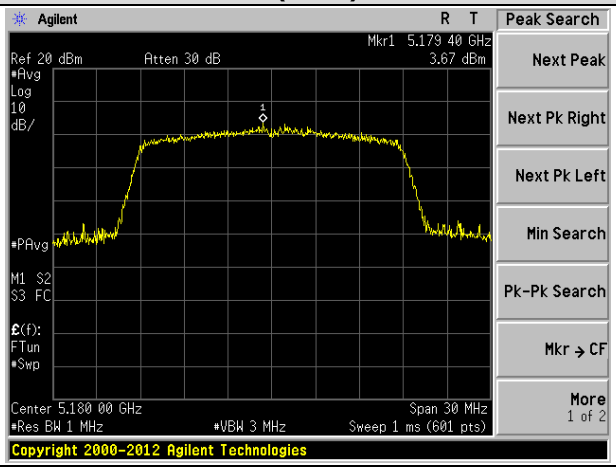
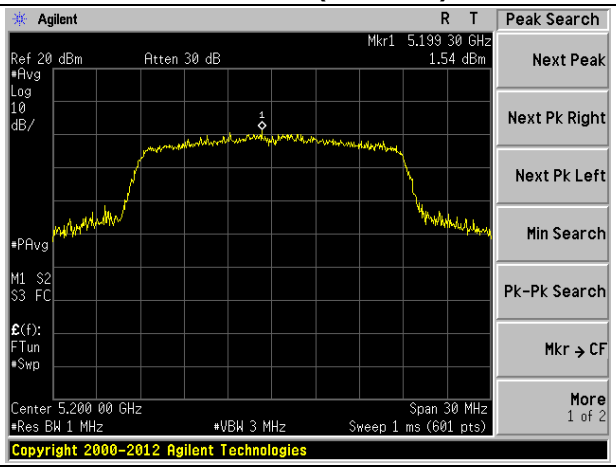
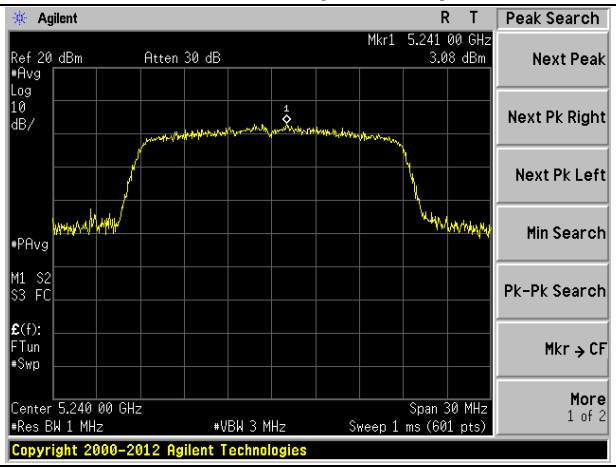
802.11ac(HT40) mode						
Channel No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
38	5190.00	-1.81	0.04	-1.77	11	Pass
46	5230.00	-1.30	0.04	-1.26	11	Pass

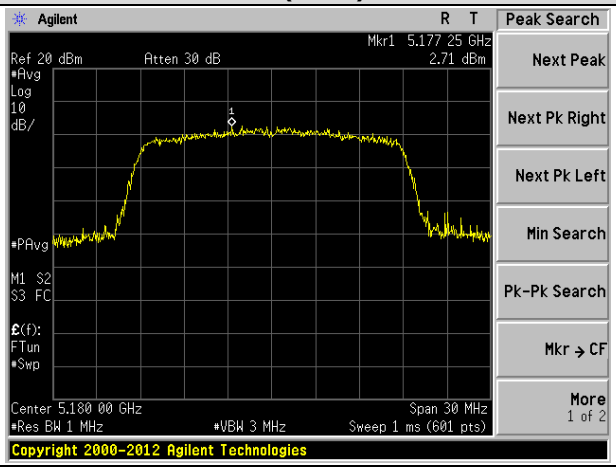
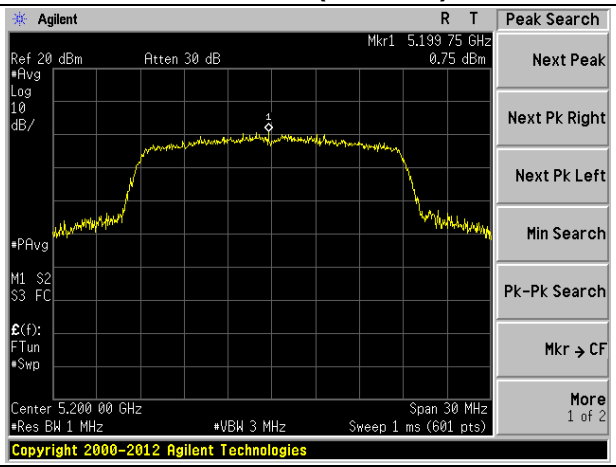
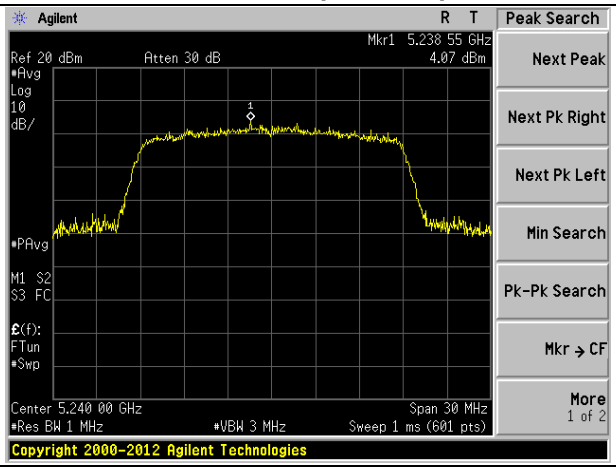
802.11ac(HT80) mode						
Channel No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
42	5210.00	-0.33	0.04	-0.29	11	Pass

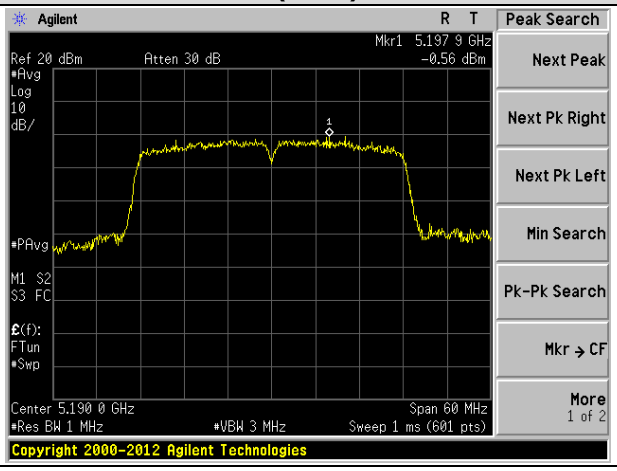
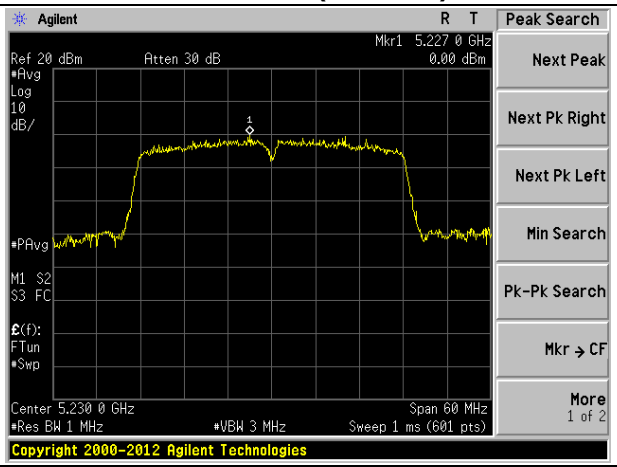
Note: Total PSD = Measured PSD + Duty Factor
Duty Factor = 10 log (1/Duty Cycle)

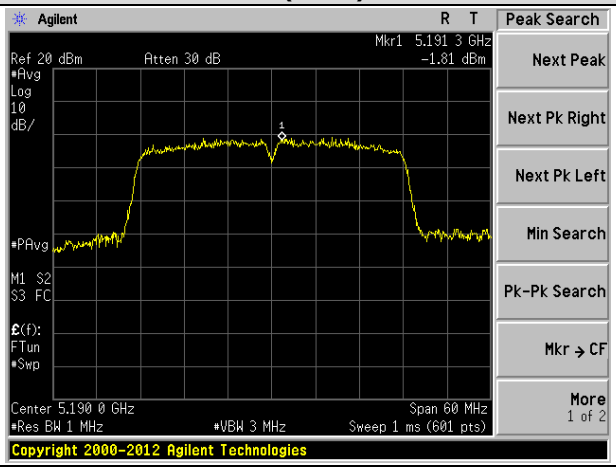
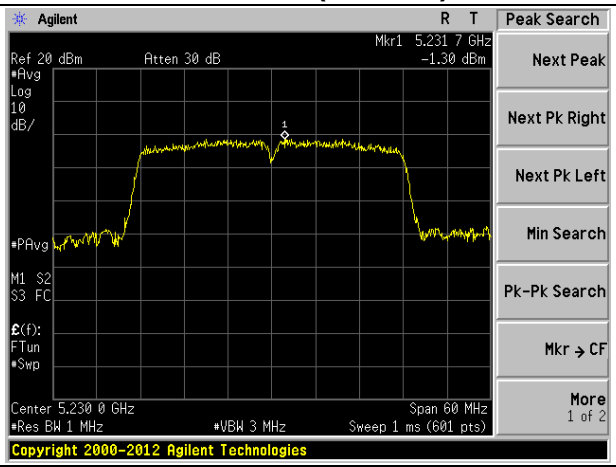
Test plots as followed:

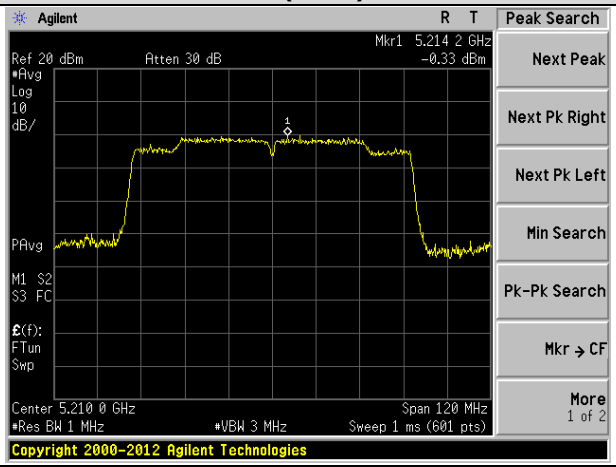
802.11a mode

Channel 36 (5180MHz)

Channel 40 (5200MHz)

Channel 48 (5240MHz)

802.11n(HT20) mode

Channel 36 (5180MHz)

Channel 40 (5200MHz)

Channel 48 (5240MHz)

802.11ac(HT20) mode

Channel 36 (5180MHz)

Channel 40 (5200MHz)

Channel 48 (5240MHz)

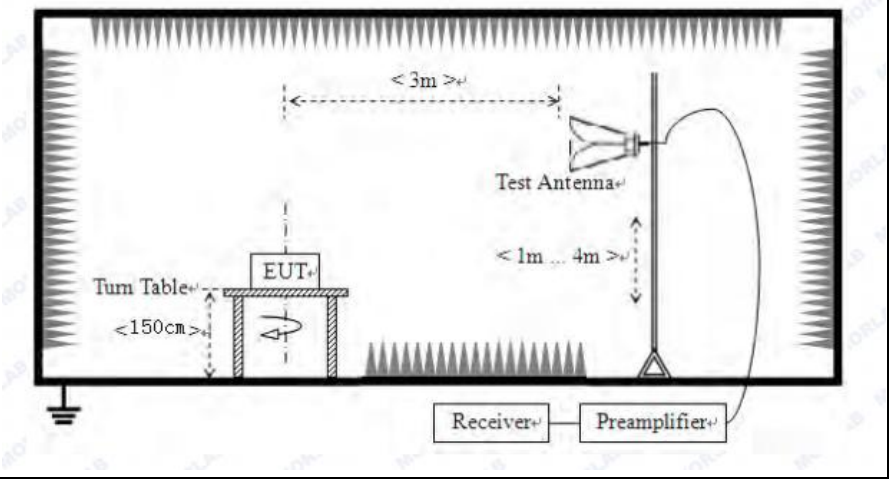
802.11n(HT40) mode

Channel 38 (5190MHz)

Channel 46 (5230MHz)

802.11ac(HT40) mode

Channel 38 (5190MHz)

Channel 46 (5230MHz)

802.11ac(HT80) mode

Channel 42 (5210MHz)

7.6 Band Edge

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 E Section 15.407 and 5.205</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m (Semi-Anechoic Chamber)</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120KHz</td><td>300KHz</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td>AV</td><td>1MHz</td><td>3MHz</td><td>Average Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></tr>
<tr><td>30MHz-88MHz</td><td>40.0</td><td>Quasi-peak Value</td></tr>
<tr><td>88MHz-216MHz</td><td>43.5</td><td>Quasi-peak Value</td></tr>
<tr><td>216MHz-960MHz</td><td>46.0</td><td>Quasi-peak Value</td></tr>
<tr><td>960MHz-1GHz</td><td>54.0</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>54.0</td><td>Average Value</td></tr>
<tr><td>68.2</td><td>Peak Value</td></tr>
</table>
Undesirable emission limits:
(1) For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.
(2) For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.
(3) For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of −27 dBm/MHz.
</td></tr>
<tr><td>Test Procedure:</td><td>
a. The EUT was placed on the top of a rotating table 1.5 m above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not
</td></tr>
</table>

	have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
Test setup:	Above 1GHz 
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.2 for details
Test voltage:	AC 120V, 60Hz
Test results:	Pass

Remarks:

1. *Level = Read Level + Antenna Factor+ Cable loss- Preamp Factor.*
2. *According to KDB 789033 D02 v02r01 section G) 1) (d), for measurements above 1000 MHz @ 3m distance, the limit of field strength is computed as follows:*
   E[dBuV/m] = EIRP[dBm] + 95.2;
   For example, if EIRP = -27dBm
   E[dBuV/m] = -27 + 95.2 = 68.2dBuV/m.

Measurement Data:

802.11a(HT20)					Lowest			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5150.00	45.66	32.07	8.99	37.49	49.23	68.20	-18.97	Vertical
5150.00	39.16	32.07	8.99	37.49	42.73	54.00	-11.27	Vertical
5150.00	47.77	32.07	8.99	37.49	51.34	68.20	-16.86	Horizontal
5150.00	39.11	32.07	8.99	37.49	42.68	54.00	-11.32	Horizontal

802.11a(HT20)					Highest			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5350.00	46.38	31.75	9.29	37.20	50.22	68.20	-17.98	Vertical
5350.00	41.04	31.75	9.29	37.20	44.88	54.00	-9.12	Vertical
5350.00	45.10	31.75	9.29	37.20	48.94	68.20	-19.26	Horizontal
5350.00	42.79	31.75	9.29	37.20	46.63	54.00	-7.37	Horizontal

802.11n(HT20)					Lowest			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5150.00	47.06	32.07	8.99	37.49	50.63	68.20	-17.57	Vertical
5150.00	39.22	32.07	8.99	37.49	42.79	54.00	-11.21	Vertical
5150.00	45.02	32.07	8.99	37.49	48.59	68.20	-19.61	Horizontal
5150.00	41.16	32.07	8.99	37.49	44.73	54.00	-9.27	Horizontal

802.11n(HT20)					Highest			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5350.00	44.97	31.75	9.29	37.20	48.81	68.20	-19.39	Vertical
5350.00	37.39	31.75	9.29	37.20	41.23	54.00	-12.77	Vertical
5350.00	47.11	31.75	9.29	37.20	50.95	68.20	-17.25	Horizontal
5350.00	39.67	31.75	9.29	37.20	43.51	54.00	-10.49	Horizontal

802.11ac(HT20)					Lowest			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5150.00	46.63	32.07	8.99	37.49	50.20	68.20	-18.00	Vertical
5150.00	41.70	32.07	8.99	37.49	45.27	54.00	-8.73	Vertical
5150.00	44.57	32.07	8.99	37.49	48.14	68.20	-20.06	Horizontal
5150.00	42.02	32.07	8.99	37.49	45.59	54.00	-8.41	Horizontal

802.11ac(HT20)					Highest			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5350.00	44.85	31.75	9.29	37.20	48.69	68.20	-19.51	Vertical
5350.00	39.23	31.75	9.29	37.20	43.07	54.00	-10.93	Vertical
5350.00	46.76	31.75	9.29	37.20	50.60	68.20	-17.60	Horizontal
5350.00	38.42	31.75	9.29	37.20	42.26	54.00	-11.74	Horizontal

802.11n(HT40)					Lowest			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5150.00	47.86	32.07	8.99	37.49	51.43	68.20	-16.77	Vertical
5150.00	40.98	32.07	8.99	37.49	44.55	54.00	-9.45	Vertical
5150.00	44.60	32.07	8.99	37.49	48.17	68.20	-20.03	Horizontal
5150.00	40.45	32.07	8.99	37.49	44.02	54.00	-9.98	Horizontal

802.11n(HT40)					Highest			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5350.00	44.03	31.75	9.29	37.20	47.87	68.20	-20.33	Vertical
5350.00	42.77	31.75	9.29	37.20	46.61	54.00	-7.39	Vertical
5350.00	47.08	31.75	9.29	37.20	50.92	68.20	-17.28	Horizontal
5350.00	38.73	31.75	9.29	37.20	42.57	54.00	-11.43	Horizontal

802.11ac(HT40)					Lowest			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5150.00	46.43	32.07	8.99	37.49	50.00	68.20	-18.20	Vertical
5150.00	41.31	32.07	8.99	37.49	44.88	54.00	-9.12	Vertical
5150.00	46.77	32.07	8.99	37.49	50.34	68.20	-17.86	Horizontal
5150.00	41.66	32.07	8.99	37.49	45.23	54.00	-8.77	Horizontal

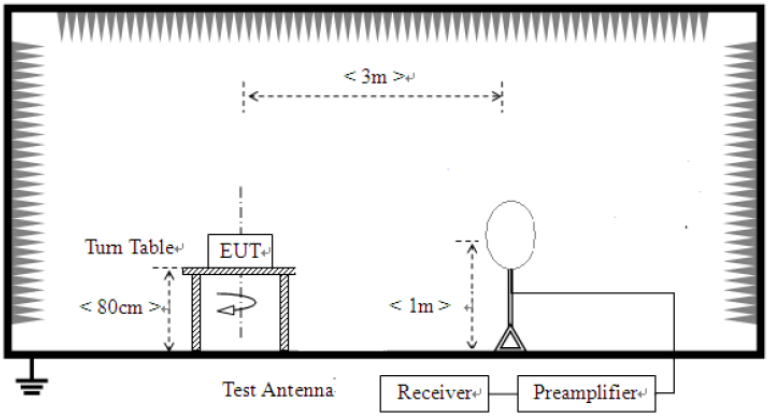
802.11ac(HT40)					Highest			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5350.00	46.81	31.75	9.29	37.20	50.65	68.20	-17.55	Vertical
5350.00	39.25	31.75	9.29	37.20	43.09	54.00	-10.91	Vertical
5350.00	44.00	31.75	9.29	37.20	47.84	68.20	-20.36	Horizontal
5350.00	39.30	31.75	9.29	37.20	43.14	54.00	-10.86	Horizontal

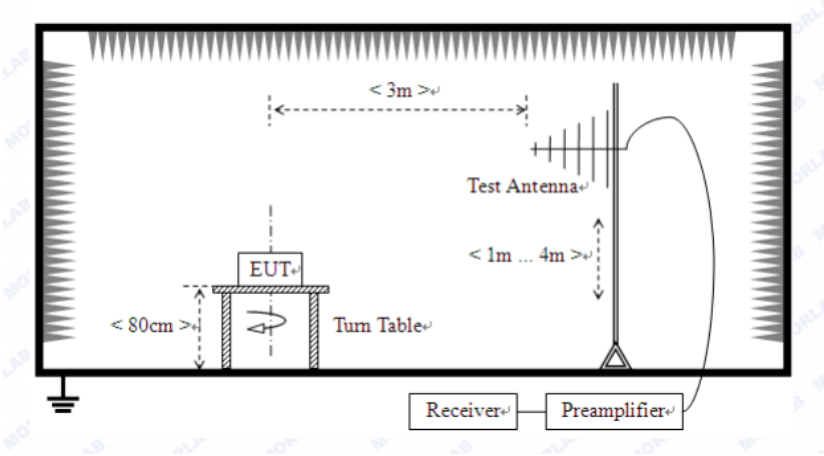
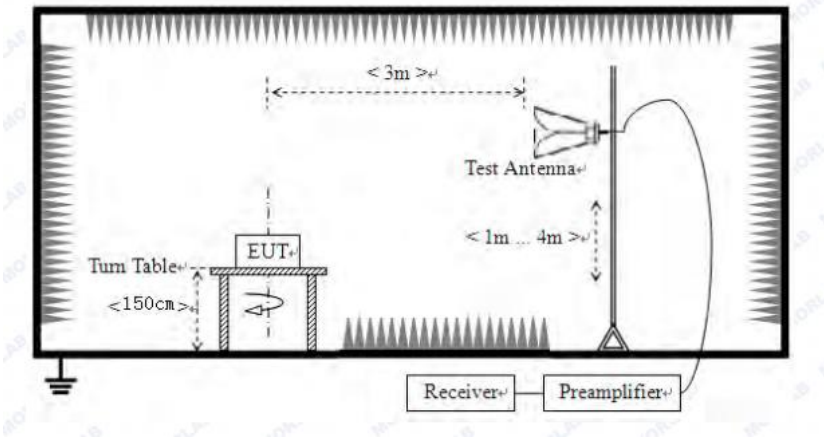
802.11ac(HT80)					Lowest			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5150.00	45.02	32.07	8.99	37.49	48.59	68.20	-19.61	Vertical
5150.00	39.14	32.07	8.99	37.49	42.71	54.00	-11.29	Vertical
5150.00	45.58	32.07	8.99	37.49	49.15	68.20	-19.05	Horizontal
5150.00	37.61	32.07	8.99	37.49	41.18	54.00	-12.82	Horizontal

802.11ac(HT80)					Highest			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5350.00	46.71	31.75	9.29	37.20	50.55	68.20	-17.65	Vertical
5350.00	42.33	31.75	9.29	37.20	46.17	54.00	-7.83	Vertical
5350.00	45.52	31.75	9.29	37.20	49.36	68.20	-18.84	Horizontal
5350.00	41.25	31.75	9.29	37.20	45.09	54.00	-8.91	Horizontal

7.7 Radiated Emission

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.209 and 15.205</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013</td></tr>
<tr><td>Test Frequency Range:</td><td>9kHz to 40GHz</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m (Semi-Anechoic Chamber)</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Value</th></tr>
<tr><td>9kHz-150KHz</td><td>Quasi-peak</td><td>200Hz</td><td>1kHz</td><td>Quasi-peak Value</td></tr>
<tr><td>150kHz-30MHz</td><td>Quasi-peak</td><td>9kHz</td><td>30kHz</td><td>Quasi-peak Value</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120KHz</td><td>300KHz</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td>AV</td><td>1MHz</td><td>3MHz</td><td>Average Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><th>Frequency</th><th>Limit (uV/m)</th><th>Value</th><th>Measurement Distance</th></tr>
<tr><td>0.009MHz-0.490MHz</td><td>2400/F(KHz)</td><td>QP</td><td>300m</td></tr>
<tr><td>0.490MHz-1.705MHz</td><td>24000/F(KHz)</td><td>QP</td><td>300m</td></tr>
<tr><td>1.705MHz-30MHz</td><td>30</td><td>QP</td><td>30m</td></tr>
<tr><td>30MHz-88MHz</td><td>100</td><td>QP</td><td rowspan="7">3m</td></tr>
<tr><td>88MHz-216MHz</td><td>150</td><td>QP</td></tr>
<tr><td>216MHz-960MHz</td><td>200</td><td>QP</td></tr>
<tr><td>960MHz-1GHz</td><td>500</td><td>QP</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>500</td><td>Average</td></tr>
<tr><td>5000</td><td>Peak</td></tr>
</table>
</td></tr>
<tr><td>Test Procedure:</td><td>Substitution method was performed to determine the actual ERP emission levels of the EUT.
The following test procedure as below:
1>.Below 1GHz test procedure:
1. The EUT was placed on the top of a rotating table (0.8m for below 1GHz and 1.5 meters for above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotable table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</td></tr>
</table>

	2>.Above 1GHz test procedure: 1. On the test site as test setup graph above,the EUT shall be placed at the 0.8m support on the turntable and in the position closest to normal use as declared by the provider. 2. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter.The output of the test antenna shall be connected to the measuring receiver. 3. The transmitter shall be switched on, if possible, without modulation and the measuring receiver shall be tuned to the frequency of the transmitter under test. 4. The test antenna shall be raised and lowered from 1m to 4m until a maximum signal level is detected by the measuring receiver. Then the turntable should be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver. 5. Repeat step 4 for test frequency with the test antenna polarized horizontally. 6. Remove the transmitter and replace it with a substitution antenna 7. Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a nonradiating cable. With the antennas at both ends vertically polarized, and with the signal generator tuned to a particular test frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output. 8. Repeat step 7 with both antennas horizontally polarized for each test frequency. 9. Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps 7 and 8 by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna by the following formula: EIRP(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBi) where: Pg is the generator output power into the substitution antenna.
Test setup:	For radiated emissions from 9kHz to 30MHz 

	For radiated emissions from 30MHz to1GHz  For radiated emissions above 1GHz 
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.2 for details
Test voltage:	AC 120V, 60Hz
Test results:	Pass

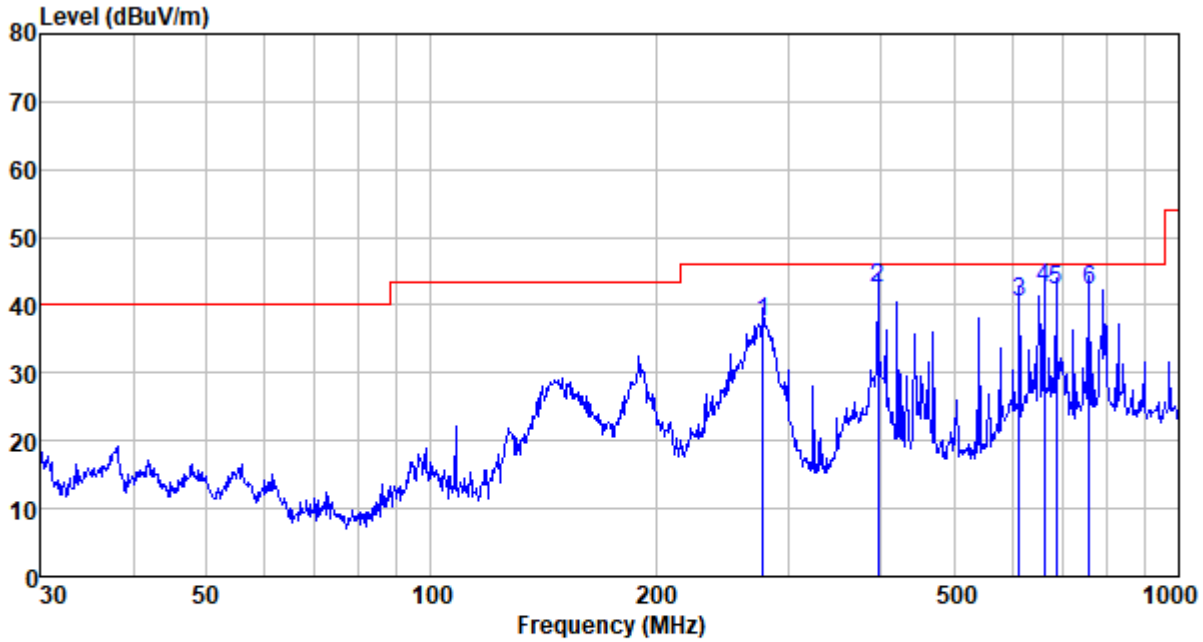
Measurement Data:

9 kHz ~ 30 MHz

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

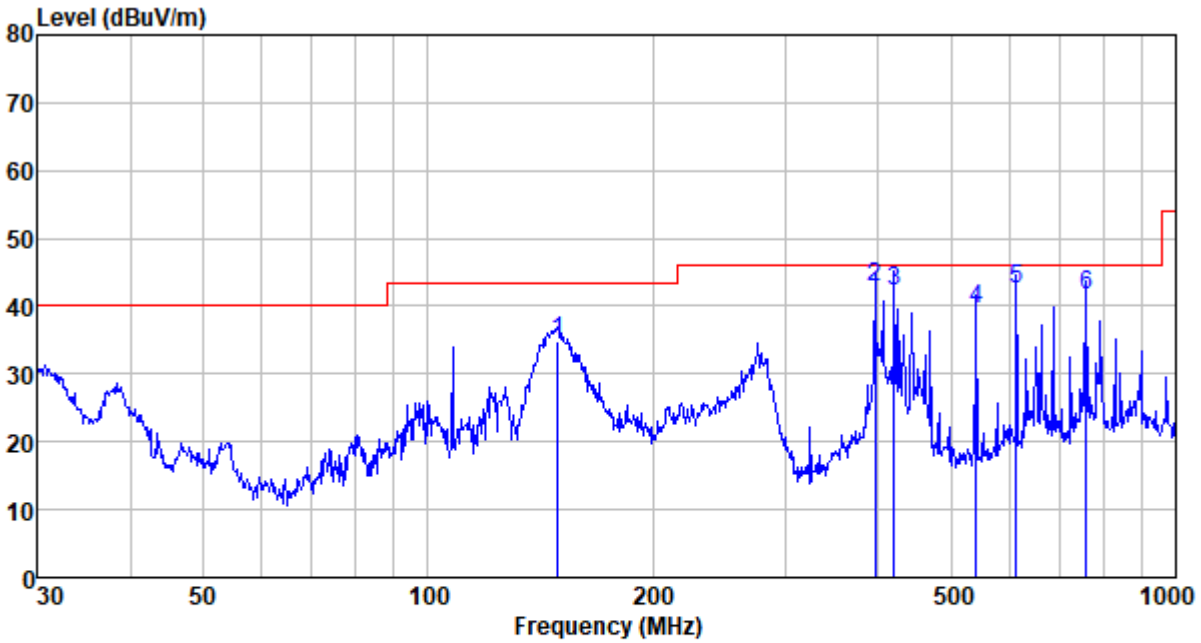
30MHz~ 1GHz

Mode:	**Transmitting mode**	**Test by:**	**Bill**
Temp./Hum.(%H):	**26℃/56%RH**	**Polarziation:**	**Horizontal**



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
278.067	59.57	13.02	2.26	37.40	37.45	46.00	-8.55	QP
396.242	62.07	15.25	2.83	37.52	42.63	46.00	-3.37	QP
612.064	54.65	19.51	3.76	37.55	40.37	46.00	-5.63	QP
661.151	56.47	19.56	3.95	37.60	42.38	46.00	-3.62	QP
684.745	56.11	19.58	4.04	37.62	42.11	46.00	-3.89	QP
758.041	54.88	20.66	4.31	37.62	42.23	46.00	-3.77	QP

Mode:	**Transmitting mode**	**Test by:**	**Bill**
Temp./Hum.(%H):	**26℃/56%RH**	**Polarziation:**	**Vertical**



Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV	dBuV/m	dB	
148.963	62.70	7.59	1.56	37.07	34.78	43.50	-8.72	QP
396.242	62.22	15.25	2.83	37.52	42.78	46.00	-3.22	QP
420.580	61.07	15.75	2.95	37.52	42.25	46.00	-3.75	QP
541.373	55.34	18.23	3.49	37.52	39.54	46.00	-6.46	QP
612.064	56.88	19.51	3.76	37.55	42.60	46.00	-3.40	QP
758.041	54.24	20.66	4.31	37.62	41.59	46.00	-4.41	QP

Above 1GHz:

802.11a(HT20) 5180MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.00	30.90	39.67	14.62	32.65	52.54	74.00	-21.46	Vertical
15540.00	28.45	38.60	17.66	34.46	52.70	74.00	-21.30	Vertical
10360.00	30.35	39.67	14.62	32.65	52.54	74.00	-21.46	Horizontal
15540.00	31.30	38.60	17.66	34.46	52.70	74.00	-21.30	Horizontal

802.11a(HT20) 5200MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10400.00	29.68	39.75	14.63	32.71	52.57	74.00	-21.43	Vertical
15600.00	32.89	38.33	17.67	34.17	52.73	74.00	-21.27	Vertical
10400.00	28.55	39.75	14.63	32.71	52.57	74.00	-21.43	Horizontal
15600.00	29.32	38.33	17.67	34.17	52.73	74.00	-21.27	Horizontal

802.11a(HT20) 5240MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10480.00	31.31	39.82	14.68	32.86	52.54	74.00	-21.46	Vertical
15720.00	30.48	38.09	17.73	33.66	53.06	74.00	-20.94	Vertical
10480.00	30.33	39.82	14.68	32.86	52.54	74.00	-21.46	Horizontal
15720.00	29.85	38.09	17.73	33.66	53.06	74.00	-20.94	Horizontal

802.11n(HT20) 5180MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.00	30.17	39.67	14.62	32.65	52.54	74.00	-21.46	Vertical
15540.00	29.41	38.60	17.66	34.46	52.70	74.00	-21.30	Vertical
10360.00	32.80	39.67	14.62	32.65	52.54	74.00	-21.46	Horizontal
15540.00	28.48	38.60	17.66	34.46	52.70	74.00	-21.30	Horizontal

802.11n(HT20) 5200MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10400.00	32.95	39.75	14.63	32.71	52.57	74.00	-21.43	Vertical
15600.00	31.26	38.33	17.67	34.17	52.73	74.00	-21.27	Vertical
10400.00	31.19	39.75	14.63	32.71	52.57	74.00	-21.43	Horizontal
15600.00	29.63	38.33	17.67	34.17	52.73	74.00	-21.27	Horizontal

802.11n(HT20) 5240MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10480.00	30.07	39.82	14.68	32.86	52.54	74.00	-21.46	Vertical
15720.00	31.73	38.09	17.73	33.66	53.06	74.00	-20.94	Vertical
10480.00	29.20	39.82	14.68	32.86	52.54	74.00	-21.46	Horizontal
15720.00	29.50	38.09	17.73	33.66	53.06	74.00	-20.94	Horizontal

802.11ac(HT20) 5180MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.00	31.60	39.71	14.63	32.68	52.56	74.00	-21.44	Vertical
15540.00	29.27	38.46	17.67	34.32	52.71	74.00	-21.29	Vertical
10360.00	30.79	39.71	14.63	32.68	52.56	74.00	-21.44	Horizontal
15540.00	29.50	38.46	17.67	34.32	52.71	74.00	-21.29	Horizontal

802.11ac(HT20) 5200MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10400.00	32.23	39.75	14.63	32.71	52.57	74.00	-21.43	Vertical
15600.00	32.59	38.33	17.67	34.17	52.73	74.00	-21.27	Vertical
10400.00	30.19	39.75	14.63	32.71	52.57	74.00	-21.43	Horizontal
15600.00	30.35	38.33	17.67	34.17	52.73	74.00	-21.27	Horizontal

802.11ac(HT20) 5240MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10480.00	31.59	39.82	14.68	32.86	52.54	74.00	-21.46	Vertical
15720.00	31.15	38.09	17.73	33.66	53.06	74.00	-20.94	Vertical
10480.00	32.21	39.82	14.68	32.86	52.54	74.00	-21.46	Horizontal
15720.00	31.39	38.09	17.73	33.66	53.06	74.00	-20.94	Horizontal

802.11nHT40) 5190MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10380.00	31.84	39.71	14.63	32.68	52.56	74.00	-21.44	Vertical
15570.00	28.81	38.46	17.67	34.32	52.71	74.00	-21.29	Vertical
10380.00	32.66	39.71	14.63	32.68	52.56	74.00	-21.44	Horizontal
15570.00	31.39	38.46	17.67	34.32	52.71	74.00	-21.29	Horizontal

802.11n(HT40) 5230MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10460.00	30.73	39.82	14.66	32.80	52.58	74.00	-21.42	Vertical
15690.00	29.82	38.09	17.71	33.81	52.89	74.00	-21.11	Vertical
10460.00	28.08	39.82	14.66	32.80	52.58	74.00	-21.42	Horizontal
15690.00	29.02	38.09	17.71	33.81	52.89	74.00	-21.11	Horizontal

802.11ac(HT40) 5190MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10380.00	30.62	39.71	14.63	32.68	52.56	74.00	-21.44	Vertical
15570.00	32.35	38.46	17.67	34.32	52.71	74.00	-21.29	Vertical
10380.00	28.77	39.71	14.63	32.68	52.56	74.00	-21.44	Horizontal
15570.00	28.51	38.46	17.67	34.32	52.71	74.00	-21.29	Horizontal

802.11ac(HT40) 5230MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10460.00	29.84	39.75	14.65	32.74	52.56	74.00	-21.44	Vertical
15690.00	29.30	38.33	17.69	34.03	52.89	74.00	-21.11	Vertical
10460.00	31.67	39.75	14.65	32.74	52.56	74.00	-21.44	Horizontal
15690.00	31.49	38.33	17.69	34.03	52.89	74.00	-21.11	Horizontal

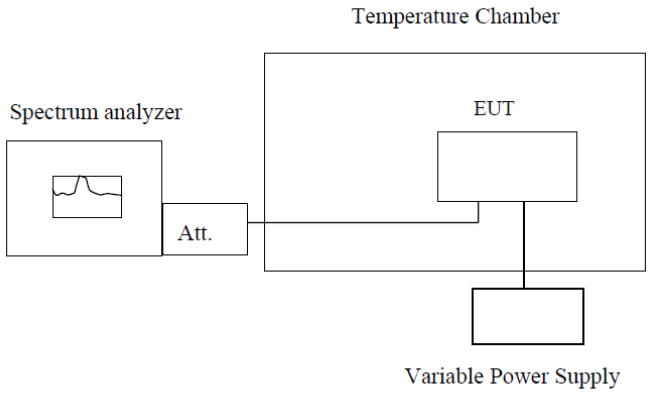
802.11ac(HT80) 5210MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10420.00	29.37	39.82	14.66	32.80	52.58	74.00	-21.42	Vertical
15630.00	31.74	38.09	17.71	33.81	52.89	74.00	-21.11	Vertical
10420.00	28.42	39.82	14.66	32.80	52.58	74.00	-21.42	Horizontal
15630.00	30.30	38.09	17.71	33.81	52.89	74.00	-21.11	Horizontal

Notes:

1. *Level = Read Level + Antenna Factor+ Cable loss- Preamp Factor.*
2. *The test trace is same as the ambient noise (the test frequency range: 18GHz~40GHz), therefore no data appear in the report.*
3. *This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.*

7.8 Frequency stability

Test Requirement:	FCC Part15 C Section 15.407(g)
Test Method:	ANSI C63.10:2013, FCC Part 2.1055
Limit:	Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified
Test Procedure:	The EUT was setup to ANSI C63.4, 2003; tested to 2.1055 for compliance to FCC Part 15.407(g) requirements.
Test setup:	 **Note :** Measurement setup for testing on Antenna connector
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Remark: Set the EUT transmits at un-modulation mode to test frequency stability.

Measurement data:

802.11a									
Frequency stability versus Temp.									
Worse Case Operating Frequency：5180MHz									
Temp. (°C)	Power Supply (Vdc)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
-30	14.40	5179.5626	Pass	5180.9652	Pass	5180.1921	Pass	5179.3953	Pass
-20	14.40	5179.4664	Pass	5180.5889	Pass	5180.3516	Pass	5179.1702	Pass
-10	14.40	5179.8155	Pass	5180.8658	Pass	5180.8477	Pass	5179.6091	Pass
0	14.40	5179.6449	Pass	5180.6408	Pass	5180.5110	Pass	5179.9403	Pass
10	14.40	5179.7650	Pass	5180.7029	Pass	5180.7412	Pass	5179.1765	Pass
20	14.40	5179.8503	Pass	5180.4976	Pass	5180.5421	Pass	5179.7017	Pass
30	14.40	5179.2033	Pass	5180.0490	Pass	5180.3680	Pass	5179.4185	Pass
40	14.40	5179.8304	Pass	5180.1868	Pass	5180.5044	Pass	5179.9556	Pass
50	14.40	5179.3912	Pass	5180.0952	Pass	5180.8545	Pass	5179.8606	Pass
Frequency stability versus Temp.									
Worse Case Operating Frequency：5180MHz									
Temp. (°C)	Power Supply (Vdc)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
25	12.24	5180.7513	Pass	5180.7141	Pass	5179.3406	Pass	5179.9819	Pass
25	14.40	5180.9980	Pass	5180.7158	Pass	5179.0821	Pass	5179.4215	Pass
25	16.56	5180.0557	Pass	5180.5628	Pass	5179.4367	Pass	5179.6256	Pass

802.11n(HT20)									
Frequency stability versus Temp.									
Worse Case Operating Frequency：5180MHz									
Temp. (°C)	Power Supply (Vdc)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
-30	14.40	5179.3563	Pass	5180.5747	Pass	5180.4153	Pass	5179.9188	Pass
-20	14.40	5179.8639	Pass	5180.5891	Pass	5180.7572	Pass	5179.9465	Pass
-10	14.40	5179.4904	Pass	5180.1149	Pass	5180.9166	Pass	5179.7957	Pass
0	14.40	5179.5740	Pass	5180.0909	Pass	5180.3186	Pass	5179.5940	Pass
10	14.40	5179.1049	Pass	5180.0280	Pass	5180.9111	Pass	5179.2800	Pass
20	14.40	5179.9354	Pass	5180.6675	Pass	5180.3582	Pass	5179.2160	Pass
30	14.40	5179.4080	Pass	5180.2879	Pass	5180.1942	Pass	5179.0336	Pass
40	14.40	5179.8003	Pass	5180.1525	Pass	5180.4178	Pass	5179.9940	Pass
50	14.40	5179.6951	Pass	5180.7576	Pass	5180.6618	Pass	5179.2968	Pass
Frequency stability versus Temp.									
Worse Case Operating Frequency：5180MHz									
Temp. (°C)	Power Supply (Vdc)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
25	12.24	5180.6647	Pass	5180.1298	Pass	5179.7698	Pass	5179.2795	Pass
25	14.40	5180.6508	Pass	5180.3938	Pass	5179.4706	Pass	5179.6794	Pass
25	16.56	5180.4296	Pass	5180.2080	Pass	5179.1207	Pass	5179.0708	Pass

802.11ac(HT20)									
Frequency stability versus Temp.									
Worse Case Operating Frequency：5180MHz									
Temp. (°C)	Power Supply (Vdc)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
-30	14.40	5179.1645	Pass	5180.5787	Pass	5180.6162	Pass	5179.0671	Pass
-20	14.40	5179.5112	Pass	5180.4237	Pass	5180.1142	Pass	5179.2967	Pass
-10	14.40	5179.6584	Pass	5180.1106	Pass	5180.9395	Pass	5179.1084	Pass
0	14.40	5179.6632	Pass	5180.8514	Pass	5180.3653	Pass	5179.1001	Pass
10	14.40	5179.3512	Pass	5180.8223	Pass	5180.4585	Pass	5179.4703	Pass
20	14.40	5179.9253	Pass	5180.5383	Pass	5180.5679	Pass	5179.8703	Pass
30	14.40	5179.5876	Pass	5180.6528	Pass	5180.3596	Pass	5179.2351	Pass
40	14.40	5179.6881	Pass	5180.4329	Pass	5180.9757	Pass	5179.9537	Pass
50	14.40	5179.7208	Pass	5180.8323	Pass	5180.4607	Pass	5179.7536	Pass
Frequency stability versus Temp.									
Worse Case Operating Frequency：5180MHz									
Temp. (°C)	Power Supply (Vdc)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
25	12.24	5180.6167	Pass	5180.5150	Pass	5179.0170	Pass	5179.7410	Pass
25	14.40	5180.4117	Pass	5180.0231	Pass	5179.1225	Pass	5179.7706	Pass
25	16.56	5180.6504	Pass	5180.4603	Pass	5179.3832	Pass	5179.8195	Pass

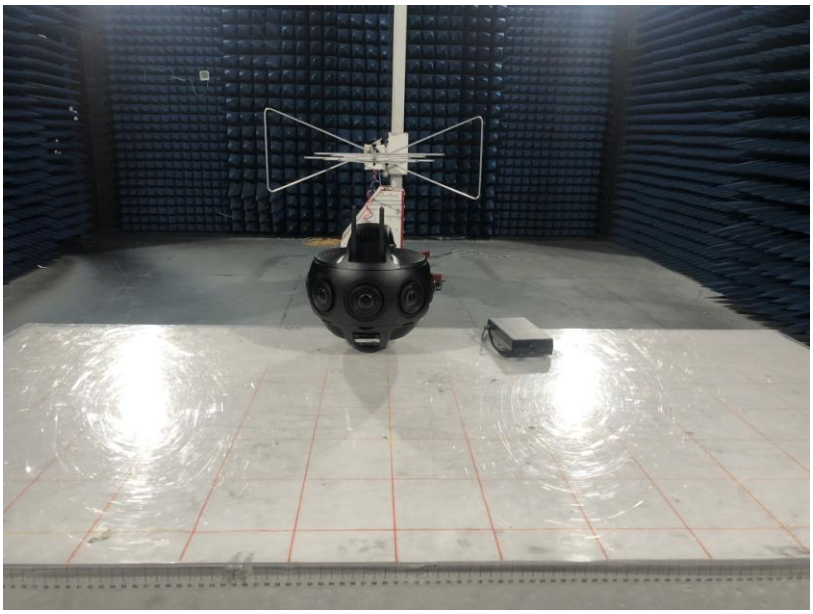
802.11n(HT40)									
Frequency stability versus Temp.									
Worse Case Operating Frequency：5190MHz									
Temp. (°C)	Power Supply (Vdc)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
-30	14.40	5189.0723	Pass	5190.2972	Pass	5190.8757	Pass	5189.6706	Pass
-20	14.40	5189.7734	Pass	5190.5071	Pass	5190.3334	Pass	5189.5138	Pass
-10	14.40	5189.3002	Pass	5190.2375	Pass	5190.2744	Pass	5189.4312	Pass
0	14.40	5189.1161	Pass	5190.9517	Pass	5190.5295	Pass	5189.4456	Pass
10	14.40	5189.8043	Pass	5190.1417	Pass	5190.9833	Pass	5189.7210	Pass
20	14.40	5189.0548	Pass	5190.5836	Pass	5190.9065	Pass	5189.0789	Pass
30	14.40	5189.1108	Pass	5190.1967	Pass	5190.2301	Pass	5189.4033	Pass
40	14.40	5189.1532	Pass	5190.2937	Pass	5190.7363	Pass	5189.5872	Pass
50	14.40	5189.8846	Pass	5190.2857	Pass	5190.6105	Pass	5189.9153	Pass
Frequency stability versus Temp.									
Worse Case Operating Frequency：5190MHz									
Temp. (°C)	Power Supply (Vdc)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
25	12.24	5190.4256	Pass	5190.3254	Pass	5189.1827	Pass	5189.0343	Pass
25	14.40	5190.6076	Pass	5190.9181	Pass	5189.8183	Pass	5189.9899	Pass
25	16.56	5190.2118	Pass	5190.5673	Pass	5189.0195	Pass	5189.7945	Pass

802.11ac(HT40)									
Frequency stability versus Temp.									
Worse Case Operating Frequency：5190MHz									
Temp. (°C)	Power Supply (Vdc)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
-30	14.40	5189.1966	Pass	5190.4168	Pass	5190.8398	Pass	5189.4543	Pass
-20	14.40	5189.7386	Pass	5190.4505	Pass	5190.5635	Pass	5189.0504	Pass
-10	14.40	5189.8358	Pass	5190.6565	Pass	5190.0011	Pass	5189.4328	Pass
0	14.40	5189.8415	Pass	5190.5449	Pass	5190.3936	Pass	5189.2768	Pass
10	14.40	5189.5267	Pass	5190.5640	Pass	5190.1791	Pass	5189.4445	Pass
20	14.40	5189.2778	Pass	5190.7372	Pass	5190.5162	Pass	5189.0714	Pass
30	14.40	5189.5235	Pass	5190.4995	Pass	5190.1854	Pass	5189.9752	Pass
40	14.40	5189.5244	Pass	5190.5776	Pass	5190.8166	Pass	5189.2972	Pass
50	14.40	5189.1574	Pass	5190.0115	Pass	5190.6240	Pass	5189.2125	Pass
Frequency stability versus Temp.									
Worse Case Operating Frequency：5190MHz									
Temp. (°C)	Power Supply (Vdc)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
25	12.24	5190.8557	Pass	5190.1715	Pass	5189.6249	Pass	5189.6253	Pass
25	14.40	5190.8235	Pass	5190.3348	Pass	5189.5688	Pass	5189.4138	Pass
25	16.56	5190.9087	Pass	5190.0716	Pass	5189.4787	Pass	5189.8138	Pass

802.11ac(HT80)									
Frequency stability versus Temp.									
Worse Case Operating Frequency：5210MHz									
Temp. (°C)	Power Supply (Vdc)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
-30	14.40	5209.4274	Pass	5210.8271	Pass	5210.1011	Pass	5209.4830	Pass
-20	14.40	5209.8141	Pass	5210.1131	Pass	5210.6141	Pass	5209.3715	Pass
-10	14.40	5209.7235	Pass	5210.7281	Pass	5210.4842	Pass	5209.7563	Pass
0	14.40	5209.8510	Pass	5210.2865	Pass	5210.3035	Pass	5209.3477	Pass
10	14.40	5209.8099	Pass	5210.1425	Pass	5210.1058	Pass	5209.3925	Pass
20	14.40	5209.5206	Pass	5210.4327	Pass	5210.0298	Pass	5209.9777	Pass
30	14.40	5209.4654	Pass	5210.6218	Pass	5210.3419	Pass	5209.8932	Pass
40	14.40	5209.5168	Pass	5210.4844	Pass	5210.4563	Pass	5209.5601	Pass
50	14.40	5209.5269	Pass	5210.2147	Pass	5210.2385	Pass	5209.8338	Pass
Frequency stability versus Temp.									
Worse Case Operating Frequency：5210MHz									
Temp. (°C)	Power Supply (Vdc)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
25	12.24	5210.5474	Pass	5210.1057	Pass	5209.9593	Pass	5209.3011	Pass
25	14.40	5210.8752	Pass	5210.0808	Pass	5209.1583	Pass	5209.1083	Pass
25	16.56	5210.0565	Pass	5210.6193	Pass	5209.3842	Pass	5209.7411	Pass

8 Test Setup Photo

Radiated Emission



Conducted Emission

9 EUT Constructional Details

Reference to the **appendix I** for details.

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